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ABSTRACT

This report condenses the essential findings of seven task reports on educational needs for the Ohio Department of Education. Emphasizing present needs, resources, and tentative solutions, the summary covers seven topics: vocational and technical education, educational finance, use and training of auxiliary personnel, data processing centers, educational technology, school library manpower, and pupil transportation. The study concludes that the State should establish regional centers to provide selected educational services to local school districts. An appendix listing the 1970 goals of the Ohio State Board of Education is included. The study was funded under Title III of ESEA. Related documents are ED 028 279, ED 032 737, ED 035 967, and EA 002 869. (LLR)

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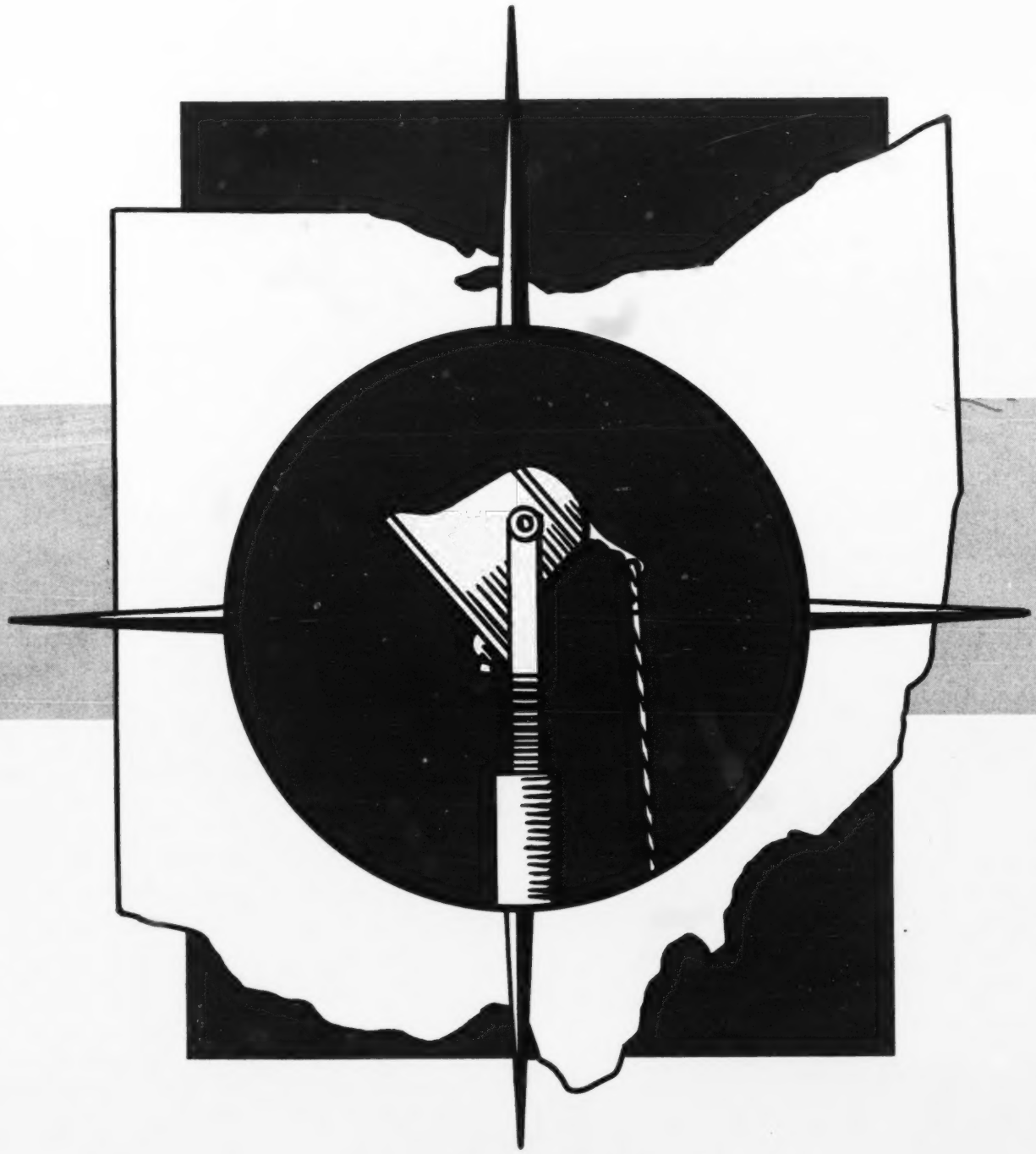

PREPARED FOR THE

OHIO DEPARTMENT OF EDUCATION

BY

BATTELLE MEMORIAL INSTITUTE
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SUMMARY REPORT

on

PLANNING TO MEET EDUCATIONAL NEEDS IN OHIO SCHOOLS

Phase I

to

OHIO DEPARTMENT OF EDUCATION

November, 1968

by

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FOREWORD

This report is the result of editing and reducing a Summary Report of seven Task Reports prepared by the staff of Battelle Memorial Institute, Columbus Laboratories, for the Ohio Department of Education under Phase I of a contract research project entitled **PLANNING TO MEET EDUCATIONAL NEEDS IN OHIO SCHOOLS.** Funds for the project were made available under a Title III, ESEA grant from the U.S. Office of Education to the Ohio Department of Education.

This condensed version of the Battelle Summary Report was prepared to present the essentials of Battelle's findings as briefly as possible without loss of content or continuity in order to facilitate dissemination of the research findings to a wider audience.

Battelle has assessed educational needs in vocational education and technical training, school facilities, paraprofessionals and supportive assistants, data processing, educational technology, library services, and pupil transportation, each of these being the subject of a research Task.

Eight reports were prepared by Battelle as a result of these studies: seven Task Reports and one Summary Report. The Task Reports represent research studies aimed at the seven subjects mentioned above. The recommendations and conclusions stated in the Task Reports do not reflect full consideration of the educational system as a whole. The Summary Report considers the Task Reports collectively and seeks to relate the results of the Task studies to the educational system as a whole.

The reader is thereby offered two views, one of a specialized nature through a Task Report and one of an integrative nature through the Summary Report. The two views have much in common, but occasionally reflect differences arising out of the different context in which the studies were viewed. Accordingly, the reader may wish to study both the Summary Report and the related Task Report on a given subject.

This report is a condensed Summary Report. It carries the essential impact of the Summary Report from which it was taken.

Dissemination of the material contained herein is the responsibility of the Ohio Department of Education. Requests for copies with designation of the report(s) desired, may be directed to Dr. Russell A. Working, Division of Research, Planning and Development, 71 East State Street, Room 205, Columbus, Ohio 43215.

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PLANNING TO MEET EDUCATIONAL NEEDS IN OHIO SCHOOLS

Phase I

INTRODUCTION

In April, 1968, the Ohio Department of Education contracted with the Columbus Laboratories of Battelle Memorial Institute to study needs, resources, and tentative solutions to needs in selected areas of education in Ohio. The purpose of the project was to provide assistance to the Department in planning to meet educational needs in Ohio schools.

Funds for the project were made available under a grant from the U. S. Office of Education to the Ohio Department of Education. The grant reflected provisions of Title III of the U. S. Elementary and Secondary Education Act of 1965 as amended by PL 90-247. The primary objectives of the Title III program are to translate the latest knowledge about teaching and learning into widespread educational practice, and to create an awareness of new programs and services of high quality that can be incorporated in schools. To capitalize fully on the opportunities offered by Title III, considerable planning is needed prior to the expenditure of operational funds. The Congress, recognizing this need, insists that State educational agencies consider carefully those elements that will contribute substantially to the advancement of educational excellence. The legislation calls for an in-depth assessment of educational needs, and an analysis of those needs in establishing a meaningful set of priorities to guide State agencies in the selection of projects.

In Ohio, the "agency" referred to above is the State Department of Education. The planning activity was construed to be in support of the leadership function which the Department was charged to exercise by Amended House Bill No. 212, a part of Ohio law. To optimize the leadership functions of the Department in a manner relevant and appropriate to the educational system in Ohio, it is necessary for that leadership to be responsive to the educational needs that exist within the State, taking full account of the resources already available. Information on needs and resources, when compared to the objectives of education in Ohio, establishes a sound basis for determining educational priorities. A feasible solution to educational problems in a period of pronounced social and technological upheaval is extremely complex at best. A clear description of needs, resources, and objectives is a cardinal requisite in considering alternative solutions at State and local educational levels.

Battelle undertook to provide research services to help with the planning. Because of the vast size of the public school system in Ohio, and the many problems attendant to public education of over two million persons, it was necessary to organize the research to focus upon specific areas. Battelle proposed that its work relate to CURRICULUM, STAFF DEVELOPMENT, SCHOOL ADMINISTRATION AND ORGANIZATION, SUPPORTIVE SERVICES FOR SCHOOLS, and SCHOOL FACILITIES.

In these broad areas, still further definition of scope was required to focus the research. This focus was provided by organizing the project into seven Tasks related to the areas mentioned. The seven Tasks were titled:

- Vocational Education and Technical Training
- School Facilities
- Paraprofessionals and Supportive Assistants
- Data Processing
- Educational Technology
- Library Services
- Pupil Transportation.

Each Task had the common characteristics that:

- It was important to the State at large.
- There was evident need for some improvement.
- There was a prospect of making improvement within a reasonable time period.
- Battelle could make available staff with appropriate qualifications to work on the Task.

In addition to the seven Tasks mentioned, Battelle proposed to provide an integrative function. The results of the research conducted on the seven Tasks would be examined for interaction, and the conclusions and recommendations drawn from the separate Tasks would be examined from a broad point of view. Specialized recommendations derived from careful study of fragments of the school system would be converted, if necessary, into compatible recommendations pertaining to the whole.

A great many recommendations are made in the Task Reports. Many of these clearly would require several years to implement. The sheer scale of implementing them all suggests that even if the will to do so were universal in Ohio and funds were unlimited, there would not be enough people available to the educational system to accomplish them all in a period of a few years.

Also some recommendations relate to needs of lesser importance than others. Several criteria were established for the purpose of permitting comparison of needs. It was found possible to apply these criteria to develop a set of "critical needs" for the Ohio public school system. All of the recommendations from the Task Reports were examined in relation to their relevance to the critical needs. This examination permitted further refinement of the recommendations. The recommendations were also related to the Ohio State Board of Education Goals for 1970 (Appendix A).

To set the stage for the discussion of the Task Reports in this Summary Report, each Task Leader provided a summary of his Task Report for inclusion herein. These summaries permit the reader to gain quickly an overview of the research, at the expense of much of the supporting detail.

The results given in the summaries are not necessarily the final results of Battelle research on the Task subjects discussed. It was anticipated that the initial contract would not cover all the research effort described in Battelle's original proposal to the Ohio Department of Education. Indeed the proposal described a comprehensive program

(not all of which would be carried out by Battelle), and proposed to accomplish only part of that program during the contract period. The Tasks carried out during that period reflected only part of the total. It is expected that additional reports will appear in late 1969.

The section entitled INTEGRATION OF TASK RECOMMENDATIONS AND INSIGHTS provides the integrative function related to the separate Tasks and the school system as a whole.

In the CONCLUSIONS section, recommendations are made based upon those in the Task Reports. The recommendations included here take into account the critical needs, and also merge certain Task recommendations into an integrative framework. Not all Task recommendations are treated in detail, but the most important ones as related to the critical needs are emphasized. Those who are interested in other recommendations or in details of the Task Reports are referred to the Foreword for suggestions.

The framework for the study is built around five key activities, which are:

- Local Need Definition
- Local Need Shaping and Filtering – Global Need Definition
- Generation of Approaches to Resolve Each Global Need
- Making Program and Priority Decisions
- Executing Decisions and Measuring Success.

The first three of these were assumed to be Battelle's responsibility; the fourth is primarily the responsibility of the Ohio Department of Education under its Title III program; and the fifth is shared by the educational community, which includes most Ohioans.

Two especially important aspects of need are seen. The first is that it is subjective and, as a consequence, often controversial and not well articulated. The second is that, without a time attached in some way to a need, it is very difficult to make it meaningful. If someone says "I need air", it is important to know whether he is suffocating or merely testifying that he shares an attribute common to all human beings. Those who express needs often ignore timing considerations. The researcher must consider them.

Local and Global Needs

Need is dealt with at two levels. The first is the local level. This is the level of individual or group expression, the origin of the statement of need. The second is the global level.

The study of local needs involves, primarily, finding out what people desire, and finding out what exists in the educational system. The difference between what someone or some group wants and what exists is called a local need. The same definition carries over to global need and to need per se, with the understanding that the researcher has expressed local need statements to make them as meaningful as possible.

Generation of Approaches

The generation of approaches to meeting a need may involve consideration of:

- Methods
- Timing
- Costs
- Legalities
- Attitudes
- Expected Results
- Success Measures.

Battelle sought, in its research, to work with global needs and approaches to their resolution; to incorporate in the research as many of these factors as time permitted; and to present the results in a form suitable for management appraisal by the Ohio Department of Education.

Program and Priority Decisions, Implementation, and Evaluation

Among the actions to be taken by the Ohio Department of Education would be making program and priority decisions in allocating Title III funds to school agencies in Ohio. These decisions would be the basis for program planning operations carried out jointly by the State and local agencies, followed by implementation and evaluation.

The Time Dimension of Planning

In any planning activity, the time span considered is a prime factor in influencing the conduct of the work. Short-term planning in education is interpreted as planning for action within the next 1 to 2 years. For example, such planning may deal with the presentation of proposals to legislative bodies, or with the conduct of research and development in local school districts, or with building construction. It characteristically involves a financial commitment of some kind, and must be rather well detailed.

Intermediate-term planning in education may relate to objectives to be achieved in a 3 to 10-year period. Such planning could involve significant changes in teacher training, major curricular changes, assessment of needs for financing school construction, enrollment predictions, estimates of job opportunities and their bearing on vocational school offerings, and prediction of possible results of short-term actions.

Long-term planning, extending beyond ten years, is of help in establishing broad directions, setting objectives that will require many years to implement, and providing a frame of reference within which intermediate-term and short-term planning may be evaluated.

SUMMARIES OF TASK REPORTS

In each Task Report a summary presented principal conclusions and/or recommendations. These summaries are included here. They are intended to serve two principal functions. First, they enable the busy reader, especially the executive, to scan rapidly the principal results of the research. Second, they provide background for the remainder of this report.

It is not intended that the summaries should be used indiscriminately by readers. A research project often produces new concepts that transcend the old. The reader is urged to consult the Task Reports for clarification of any matter upon which he develops a strong reaction when reading this Summary Report.

VOCATIONAL EDUCATION AND TECHNICAL TRAINING

The vocational education and technical training task began as a curriculum study under the direction of Mr. Dennis McFadden. However, it soon became clear that, within Ohio, the problem of providing access to vocational education for all students desiring it was rather severe. Likewise, the management structure and financing structure for vocational education seemed to present barriers to speedy action to provide opportunities open to all students. The complexities of having joint vocational districts superimposed upon local districts, crossing county lines, and creating multiple taxing structures that would be highly confusing to taxpayers called for reexamination of districting problems. It also seemed clear that the objectives of vocational education were not spelled out adequately to permit the researchers to focus upon the attainment of specific objectives in the curriculum area.

Accordingly, the Task was reoriented toward a study of districting problems and objectives of vocational education. Leadership was assumed by Dr. Marshall Metze and the districting study was begun under Dr. Halder Fisher.

A severe semantic difficulty was encountered. Within Ohio, and presumably in other states as well, the terms "vocational education" and "technical training" had rather clearly defined meaning. To help relate the research results to what now exists, it was found beneficial to use the term "work-oriented education" to describe the total array of possibilities that could involve the education of pupils and adults, in relation to the "world of work". Vocational education and technical training are substantial components of this array.

The report prepared as a result of this research Task is a progress report rather than a final report. The research is continuing into 1969. The title of the Task Report is "Vocational Education and Technical Training".

The report on vocational and technical education is divided into three major sections: (1) a description of the conceptual system for work-oriented education, (2) a description of the process used to develop regional administrative units, and (3) a set of recommendations for implementation and for additional research. Several appendices including statistical data, certain subreports related to the overall project, and maps for the administrative units also are included in the Task Report. The maps are well-suited to use with a transparent overlay to show the relationship of the proposed regional units to existing joint vocational school districts.

The first section contains a preliminary model for the management of a work-oriented educational system. The need for the development of this model emerged when a study of vocational and technical education in Ohio resulted in these tentative conclusions:

(1) Education for work must be related to the goals of society and of the individual

(2) Planning must be based upon accurate and useful data, and programs must be authorized and funded on the basis of these data

(3) Education for specific jobs must be replaced by training in occupational fields or clusters

(4) The educational system must accept more responsibility for the postschool success and productivity of students

(5) Education for work must be expanded to provide a wider range of course offerings for a wider range of student ages

(6) Evaluation of education for work must be based upon the deviation between stated objectives and what is actually accomplished.

Based on these tentative conclusions, a need for a more comprehensive program was indicated.

A Proposed System for Work-Oriented Education

As a result of several seminars held at the Columbus Laboratories of Battelle Memorial Institute, the concept of vocational and technical education was incorporated under the umbrella of work-oriented education.

After accepting work-oriented education as an appropriate descriptor of the desired system, three workshops were held. In these workshops, objectives of the desired work-oriented educational system were specified, barriers and constraints were discussed, and implementation of the objectives was considered. From these workshops, a set of broad educational goals or objectives were developed, the primary system objective was specified, and the specification of selected component objectives was begun.

The Primary System Objective

The primary objective for work-oriented education is:

Each individual, when completing a work-oriented educational program, shall be able to determine the location of work related to the training received, to seek out and obtain work, and to be successful in terms of both immediate performance and progress within the work setting.

Several implications of the objective are discussed.

Components of the Work-Oriented Educational System

Six components of the work-oriented educational system were identified: (1) students, (2) instructional staff, (3) management-administration, (4) curriculum, (5) supportive services, and (6) facilities and equipment. A discussion of the components defined the scope of each as contributing to the implementation of the primary system objective.

In the remainder of the report, emphasis is given to the objectives of selected components and factors to be considered in the implementation of the objectives of each component.

Regionalization

The second section is the result of research undertaken to implement a recommendation made in the third section. This report on regionalization will assist the Ohio Department of Education in establishing a set of administrative units for the administration of a work-oriented education system. It describes the use of a regionalization plan which includes these purposes:

(1) To establish administrative units for middle management, for statistical reporting, and for planning

(2) Financial considerations

(3) To maintain a comprehensive program

(4) To support a decentralization need

(5) To make decisions by the most objective method possible.

Some of the methodological considerations in this regionalization effort were decisions regarding the size of the units as the basic building blocks of the administrative units. The county units were chosen for several reasons including: (1) counties have a full range of organizational features, legal powers, etc., and (2) counties are a standard statistical-reporting unit for federal and state governments.

The criteria used for regionalization of counties included (1) regional compactness, (2) continguity, (3) historical association, (4) homogeneity or complementarity, (5) student population, (6) financial resources, and (7) political feasibility. In addition, a list of 24 variables collected on a county basis were used in regionalization.

Seven alternative sets of administrative units for work-oriented education were developed around county lines. Three sets were based on the minimum, maximum, and optimum number of students who could conceivably enroll in a typical joint vocational school under present guidelines and present enrollment figures although the proposed administrative units would apply also to the work-oriented educational program. The other four sets of units were established around the concept of regional management of work-oriented programs with subregional districts formed around county lines.

Recommendations

The third section presents the recommendations for implementation. The major headings are listed below with a discussion of the recommendations included in the report:

(1) Regional administrative units should be authorized by the State Legislature to provide the management and leadership of the proposed work-oriented educational system.

(2) An interdisciplinary curriculum commission should be established to develop State curriculum guidelines for each level of work-oriented education. This commission should recommend to the Ohio Department of Education a procedure to require, by the fall of 1971, each school receiving foundation funds to integrate the work-oriented education curriculum.

(3) Each student, when completing a work-oriented educational program, shall be placed by the guidance service in a job relating to his training.

(4) At least one regional training institute should be established in each region.

(5) Work-oriented education programs should operate on a year-round basis, although students would be required to attend only two out of three trimesters or three of four quarters.

(6) For those students now enrolled in general or academic programs who do not want to select programs in an occupational field for grades 11-12, intermediate orientation in appropriate occupational fields combined with nonoccupational work education should be required for graduation.

(7) All students, grades 9-10, should receive elementary orientation in occupational fields as part of the work-oriented curriculum.

(8) The work-oriented educational curriculum should be adopted as part of the general curriculum.

(9) The trend to separate vocational high school from comprehensive high schools should be slowed. The artificiality of such arrangements creates an abnormal schism in the ranks of professional educators, contributes little to the improvement of the image of vocational education, and duplicates many functions of the districts lowering the efficiency of management-administration.

(10) The authorization and funding of programs should be supported by an analysis of manpower projections and the labor force. An index of potential employer needs also should be applied.

(11) A commitment by the Ohio Department of Education should be made for the development of work-oriented education. This commitment would state that policy decisions will be made on the basis of valid and reliable research data.

In addition to these items, fifteen recommendations for additional research are listed.

PROGRAMS TO FINANCE OHIO'S SCHOOL FACILITIES

The school facilities task, under the direction of Dr. Harold Hovey, examined needs for the construction of new school buildings, and considered alternative methods of financing such construction. As part of the supporting work, school enrollment projections extending through 1975 were made. The Task Report was entitled "Programs to Finance Ohio's School Facilities".

The report begins by setting the framework for analysis. Battelle's research was focused upon describing the current school buildings situation in Ohio and relating that situation, particularly the state buildings program, to short-term and intermediate-term needs.

The first major section of the report deals with the current school building situation. Current and projected enrollment is discussed, and Battelle's methodology for enrollment projections is described. These projections were developed for Ohio as a whole, each Ohio county, and for individual school districts. Only the county and state projections are included in the report; projections for individual districts can be retrieved from a computer tape. These projections indicate a decline in elementary enrollments on a state basis focusing on 1975. During the same period, however, high school enrollments will increase substantially – suggesting that on a state basis the need for new school capacity will be centered at the secondary level. However, statewide enrollment increases are not the only source of demands for school construction. Certain districts have sharp enrollment increases, and thus major building needs, at the same time that other districts may be losing enrollment. Also, there is a substantial backlog of building needed to replace obsolete and educationally inadequate facilities.

The primary source of funds to meet building needs is local – the issuance of bonds which are serviced by local taxes. Ohio, unlike some other states, does not play a major role in school construction. The State does, however, conduct a building program designed for those districts that cannot legally provide for their own needs because of the 9 percent limitation on bonded indebtedness as a percentage of assessed value. The State's program is described in detail in the report.

The second major section focuses specifically on determining needs in the facilities area. Needs are considered to be the gap between current objectives and the current situation. Objectives of the State Department of Education are discussed in terms of (1) activity level (more and better education), (2) efficiency, (3) distributive (equal educational opportunity), and (4) procedural (local control). These objectives are shown to lead to differing conclusions about programs to finance school facilities. Current needs are also reviewed through an analysis of superintendents' responses to

a Battelle questionnaire. These responses indicated that the superintendents in the districts that may need state aid seem generally to be seeking additional state funds and reduced state control over the use of those funds. The current State building program is reviewed in light of the equity and efficiency objectives with the conclusion that complete funding of the State program (providing the requested level of assistance for all eligible districts) may tend toward some inefficiency in resource allocation, but that less than full funding may be inequitable. Current weaknesses in school facilities planning in some of the smaller districts are also discussed in this section of the report.

The third section deals with the short-run evaluation of the current State program for financing school construction. Battelle provided questionnaires on building needs to all Ohio superintendents and developed its own computer-assisted method for independent analysis of building needs. Following a discussion of the potential estimating error inherent in each of these methods, the report presents "high estimates" of approximately $171 million which could conceivably be used for the State program in the next three fiscal biennia. However, it is noted that for a variety of reasons, many of these demands are unlikely to materialize. Some of them, for example those made by districts which do not maintain a high school enrollment of over 500, would not normally be met by the State. The school districts likely to benefit from substantial State assistance appropriations are shown to be the rapidly growing suburban districts with less than average assessed property value per pupil, but not necessarily with low incomes or low residential property values. An appropriation of about $20 million per bienneum is considered appropriate for a tight funding level; if all eligible districts are to receive funds (including some districts with high school enrollment below 500), appropriations of roughly $40 million per biennium could be used. However, Battelle does not necessarily recommend these appropriation levels. Whether they are appropriate depends upon decisions by the Legislature and the State Board on the relative priority of needs in the suburban districts likely to benefit from the State program and in central city and many rural districts which do not meet the criteria for participation in the State building program.

A variety of short-run alternatives to the present building program are discussed and evaluated. These include (1) terminating the program and replacing it with lease-purchase plans and/or removing the limitation on bonded indebtedness, (2) raising local repayment requirements through some combination of increasing the one-half mill payback, extending the payback years and charging interest for full repayment, and (3) utilizing future local bonding capacity to accelerate repayment to the state. Given the assumptions specified in the report, some combination of the latter two alternatives is recommended.

On the basis of the expressed preferences of superintendents responding to the questionnaire and a review of State leadership in facilities planning and innovation, the report recommends an expanded role for the State Department of Education in school facilities planning.

The final section shifts to a longer range focus to consider alternatives to the current building program. The concept of handling facilities as part of a State foundation program is found to be desirable, largely because it permits school authorities to balance facility needs with other educational needs without having choices distorted by programs that provide more State sharing of one type of expenditure than another. However, largely because it fails to meet equity criteria, the current foundation program is not considered to be an appropriate vehicle for facilities financing. An equal

effort-equal result type foundation formula might well provide a good vehicle for facilities financing, but such a formula in its pure form would be too expensive for Ohio to adopt unless actions were first taken to reduce the current wide disparities in financial capacity among Ohio school districts. A countywide tax base for schools would represent a major step in that direction. However, time and resource limitations have not permitted Battelle to examine all of the factors besides facilities financing which might be appropriate to consider in developing a foundation formula that could include facilities financing. Further research – such as that now being undertaken by the Legislative Service Commission – would be extremely helpful in developing a new foundation formula.

THE USE AND TRAINING OF AUXILIARY PERSONNEL IN EDUCATION

This paraprofessionals and supportive assistants task began with the recognition that many persons who are not certificated as teachers are now performing duties in the public schools in many states, including Ohio. Their roles in education and their relation to teachers is generally not well-defined. Ohio had not taken a comprehensive formal stance, in the form of legislation, with respect to the employment and service conditions for those persons. Few data were available concerning their numbers, what they were doing in the schools, and what the need might be for such people, both in terms of numbers and in terms of provision for training.

Mr. Kenneth Connell was the Task Leader. He found that several states were a bit further along than Ohio in defining the roles of these individuals. Also he found that most states have elected to call them "auxiliaries". In addition to studying what had been done in other states, Battelle conducted a survey to see what was occurring in Ohio and to determine needs for auxiliary personnel in Ohio.

The Task Report is entitled "The Use and Training of Auxiliary Personnel in Education".

The general purpose of this research was to identify needs, resources, and alternative solutions to needs for the use and training of auxiliary personnel in Ohio's educational system. As used throughout this report, the expression "auxiliary personnel" refers to employees who, though lacking the traditional requirements for the education profession, perform auxiliary functions as defined by Webster's New World Dictionary, i.e., they "help, assist, and give aid and support to" the learning-teaching process.

Conclusions

Based on the study findings, several conclusions were reached about the use and training of auxiliary personnel in Ohio's educational system. Major conclusions appear as follows:

General Conclusion

When auxiliaries are properly trained and utilized, they can make significant contributions to the total educational program. More specifically, appropriate use of adequately trained auxiliaries can lead to direct benefits for students and professionals. Further, when low-income parents from the neighborhood school area are employed as auxiliaries, substantial indirect (often unanticipated) benefits can result for the school, the parents, the community, and society-at-large.

Need for Information at the Local Level About Non-State Administered Federal Programs

Because the "bulk" of funding for training and utilization of auxiliaries presently originates at the State and Federal levels, and because patterns of funding are emerging swiftly and changing rapidly, there is a need at the local level for information about sources of funding. It appears that ODE would be providing a much needed service if it could make information about non-State administered federal programs more available to interested local school districts.

Use of Auxiliaries

The State educational system will require many different types and levels of auxiliary personnel if it is to meet the needs of individual school districts. Individual districts can be expected to differ considerably from each other in terms of the types and levels of auxiliaries best-suited to their respective needs. Therefore, decisions about desired levels and types of utilization should remain primarily a school district function. This means that it will be necessary for individual school districts to assume responsibility for seeing that auxiliaries are qualified to perform the tasks they are assigned.

Training of Auxiliaries

In response to the needs of local districts for different types and levels of auxiliary personnel, our State educational institutions need to provide "multiple ports of entry" through development of appropriate types and levels of pre-employment education and training. In addition, however, it is critical that pre-service and in-service training not be neglected by local school districts. (In fact, when entry level positions are involved, the responsibility for training will rest primarily with individual school districts.) Because auxiliaries are being introduced into a "social system", there is a fundamental need for preparing both the auxiliaries and the professionals to work effectively together. Furthermore, it appears that other school and district personnel will require some preparation if they are to anticipate eventual changes in their own roles in the system. For this reason, certified school personnel should be involved in the design, implementation, and evaluation of those pre-service and in-service auxiliary training programs that will ultimately affect them.

Integrated Utilization and Training

A major long-term objective of the State educational system should be to design and implement an integrated program of utilization and training for auxiliaries and professional staff. Such a program would need to be consistent with the staff development needs of local school districts. It is hoped that opportunities for interaction among ODE, local school systems, and institutions of higher learning under the Education Professions Development Act will lead toward such an integrated program of training and utilization.

Certification

It is concluded that, at this time, certification of auxiliary personnel would generally be inappropriate, premature, and restrictive in its effects upon the use of auxiliary personnel in Ohio elementary and secondary schools. However, there does appear to be a need for ODE guidelines on the use and training of all types of auxiliary personnel. There also appears to be a need for legislation to authorize the use of qualified auxiliaries in supportive roles in Ohio's educational system, including authorization of their performance of instructional and supervisory duties under the direction and supervision of certified, professional school personnel. Under such legislation, professional personnel clearly must retain responsibility and accountability for student progress. Permission to administer corporal punishment should be explicitly withheld from any authorization of auxiliaries to regulate pupil behavior.

A distinction needs to be made between clerks and auxiliary educational personnel. Clerks should be excluded from the class of persons defined as auxiliaries and from future considerations involving certification and/or licensing. It is also our view that ODE should establish administrative machinery similar to that developed in New Jersey and proposed in California, including: (1) the collection of task descriptions and statements of personnel qualifications for each type of auxiliary position created by local school districts, (2) the review and approval of the auxiliary positions, and (3) the issuance of permits to the individual persons who are employed by local districts in the various auxiliary positions. In our view, this system would not impose levels or patterns of usage on local districts, and yet, it would provide basic information for use in establishing a proper balance between levels of training and levels of utilization throughout the State.

REGIONAL DATA PROCESSING CENTERS IN OHIO

The data processing task was addressed to determining the needs for data processing services in Ohio schools. It was found early in the research that the most expeditious approach for handling these services in Ohio, based upon the existing situation in the State, was to provide these services on a regional basis. Accordingly the report on this Task is entitled "Regional Data Processing Centers in Ohio". The Task Leader was Mr. William Drozda.

The data processing task was directed at identifying the needs for regional data processing centers in the State of Ohio. Only the administrative use of computers was considered in this analysis. The evaluation of regional data processing needs included

an analysis of the basic computer applications, the needs of the school districts as a function of their enrollment size, and a survey of the school districts' computer use and future plans. In addition, discussions with local school district and state personnel contributed significantly to the study.

The analysis indicates that regional data processing centers are justified on the basis of the potential reduction of data processing costs to the school districts. It is recommended, therefore, that the State of Ohio initiate actions to establish these centers. A basic implementation plan is presented such that the costs of the program can be absorbed over a long time interval. No computer hardware should be obtained initially. Instead, work should be initiated with those districts already having adequate hardware to qualify as regional centers. By working with these centers, the operational problems can be resolved before the centers are made available on a statewide basis.

A financial study should precede a survey of the local districts to determine their interest. In this manner, the districts will receive an estimate of the costs associated with regional data processing centers. It is recommended that the local districts be charged a fee for the service to offset the possibility of unnecessary computer use. The fee charged should be financially attractive to the local districts to encourage a maximum participation.

The primary recommendations made are as follows:

(1) Twelve regional data processing centers should be established. Three centers have adequate equipment and one should be selected as an initial center on an experimental basis.

(2) It is recommended that an Information Services Group be established within the Ohio Department of Education. If full regional operations are established in 1972, a central staff of 24 people and a regional staff of 18 people will be required in the Information Services Group. In addition, a position of Reports Coordinator should be established.

(3) School districts with less than 1500 students in ADM have no significant data processing needs and should not affect planning for regional operations.

(4) Regional data processing centers should initially be established under the local control of the region. After full regional operations are established, all operations should be under the management of the Ohio Department of Education.

EDUCATIONAL TECHNOLOGY – ITS APPLICATION IN OHIO SCHOOLS

The educational technology task recognized that there is great interest in educational circles in "educational technology", as evinced by numerous national meetings on the topic, support at federal levels for research in this area, and a growing belief that educational technology offers potential of providing for more highly individualized instruction at reasonable cost.

It was not known where Ohio schools stood at present in this field. Accordingly, the aim of this Task was primarily to survey resources in the State, with emphasis upon the audio-visual materials that make up the bulk of equipment used to supplement the lecture method of teaching. The survey also was intended to assess needs for audio-visual aids, and to determine the present supply arrangements. Time and funds did not permit investigation of the changes that probably will ensue from developments in video-tape units and probable decreases in costs of such units, nor was it possible to project increased usage in Ohio of various forms of programmed instruction or computer-assisted instruction. The former is known to be undergoing substantial testing in some school systems, and the latter is known to be the subject of potentially significant research.

Mr. Daniel Molnar was the Task Leader of this Task. The Task Report is titled "Educational Technology – Its Application in Ohio Schools".

The principal purpose of this study was to assess needs and resources in Ohio public schools that relate to educational technology. Because "need" is a subjective concept, the need assessment involved literature study and consultation with persons knowledgeable in educational technology. Resources were assessed objectively through a questionnaire mailed to a representative sample of Ohio school districts. The questionnaire included questions concerning subjective opinions as to Ohio's needs in educational technology.

It was found that numerous research investigations which were technically well conducted with the aim of measuring learning benefits derived from the use of instructional tools such as television, films, and projectors had typically failed to establish that significant differences in student achievement resulted from the use of such tools. Their continued use rests on observation of non-measured factors, such as student interest, and the belief that their use enriches the content of learning programs.

It was found that, on the average, Ohio schools are fairly well equipped and supplied with the specific audiovisual materials and equipment that were listed in the resources survey. Little evidence was found that Ohio is significantly involved in the kind of effort taking place elsewhere that seeks to make use of the newest elements of educational technology such as programmed instruction and computer-assisted instruction. There was evidence that many teachers do not know how to make effective use of the equipment and materials that are available, possibly reflecting little or no exposure to these items in their training in education. There is considerably activity in Ohio in the ETV field, but a detailed examination of this aspect of educational technology was not within the scope of this study.

For this study the objectives of educational technology were defined as follows:

(1) To provide enrichment in the student's course of study

(2) To implement a variety of teaching methods applicable to children involved in Special Education

(3) To provide more individualized instruction at a reasonable cost.

Enrichment is interpreted as the addition of greater breadth or depth of instruction than can normally be obtained by a standard classroom lecture. In order to discuss methods of providing such enrichment, it is worthwhile to distinguish between adjunct enrichment and complementary enrichment. This distinction is made on the basis of the extent to which the materials and equipment are integrated into a course of instruction. In the extreme, adjunct enrichment materials could be used at any time or even omitted without significant modification of the course of instruction. On the other hand, complementary enrichment materials, if not available, would necessitate modification of the course. Materials which are highly desirable for use at a specific point in a course, but which are not essential for use at that time, would be on the borderline between the two categories.

It was found that the principal use of educational technology in Ohio is to provide adjunct enrichment, and that resources for this purpose are in fair supply. Little evidence was found that the modern technologies, such as computer-assisted instruction, were being applied in Ohio, even on an experimental basis, for the purpose of increasing individualized instruction.

The recommendations made as a consequence of this study are:

(1) The Ohio Department of Education should plan to provide impetus for a program to develop integrative (complementary) uses of technology in education. A study should be initiated to determine ways to provide this impetus.

(2) The Department of Education should consider a program to determine the feasibility of making a series of cost/benefit studies of uses of technology in specific areas of course and curriculum.

(3) The distribution systems for instructional materials to be used for complementary enrichment should be as close as possible to the teachers using the materials. Therefore, school-based, district-based, or even region-based distribution systems are superior to a central distribution agency for complementary materials.

(4) The film library of the Division of Instructional Materials is now one of a number of valuable sources of adjunct enrichment films. This library should be maintained at approximately its present level as long as the current demand for its films continues.

(5) Ohio should undertake some exploratory research in individual schools to help prepare educators to evaluate advances in CAI and the related aspects of individualized instruction through the use of technology.

STUDY OF OHIO PUBLIC SCHOOL LIBRARY MANPOWER

Initially the library services task was aimed principally at determining what resources existed in the schools for providing library services. It was soon recognized, however, in many Ohio schools the library resources were generally deficient with respect to all available standards. It became clear that a primary factor in improving libraries would be the availability of staff who were capable of providing library services. Therefore, the Task took the direction of a study of potential sources of library manpower. The original purpose of determining available resources was not dropped, but was pursued on a longer time schedule. A survey was conducted to determine present library resources. The results of this survey are currently being processed on a digital computer, and will be reported later.

The report on this Task is entitled "Study of Ohio Public School Library Manpower". The Task Leader was Mrs. Joyce Allen, but the report is the work of Mr. George Rosinger. Mrs. Allen is presently compiling data from the resource survey.

The objective of this study was to investigate the resources, needs, constraints, and tentative solutions that relate to staffing present and future school library systems in Ohio with trained personnel. Information and statistical data on various facets of the school library manpower problem were presented and discussed. The principal findings of the study are summarized below:

(1) The majority of states have adopted standards for elementary school libraries.

(2) The minimum State standards regarding library staffing are not being met by many Ohio public schools.

(3) There is a general shortage of certificated librarians in Ohio's schools, and Ohio generally lags the nation in terms of student-to-librarian ratio.

(4) There are approximately 1,290 certificated librarians (of which about 20 percent are part-time personnel) serving 4,227 Ohio schools.

(5) On the average, in Ohio, there is about one certificated librarian for every 3.3 schools, or one librarian per 1,839 students. (As of 1964-65 the national student-to-librarian ratio was about 1,009 students per librarian.)

(6) It is estimated that roughly 2,000 additional full-time librarians (or the part-time equivalent) would be required to meet the present needs of Ohio's public schools. This number would continue to be adequate through 1975. (The requirements for 2,000 assumes a ratio of one librarian per 750 students – including those in the elementary schools.)

(7) Estimates indicated that there are over 4,300 library assistants working in the schools, the majority of which (about 76 percent) are serving at the elementary school level.

(8) A survey of the number of librarians and library technical aides being trained in Ohio universities and colleges indicated that only a small fraction of the required number of personnel are being graduated.

(9) While the educational attainment of certificated librarians presently serving in the schools compares favorably with librarians nationally, the starting salaries for Ohio's school librarians are somewhat lower (by about $500 annually) than the national average.

A number of approaches or tentative solutions for meeting school needs for trained library manpower over the next few years were proposed, and are summarized below:

(1) The recruiting of individuals with Bachelor's degrees (or above) to serve as librarians in the schools (These individuals would participate in a short intensive course prior to reporting for library work, and would be required to complete the necessary hours in library science by a specified time.)

(2) The recruiting of newly graduated teachers and perhaps those currently teaching in the schools to serve as librarians (The comment in (1) above regarding the short intensive course and the requirement for subsequent completion of the necessary hours in library science, applies here also.)

(3) The training and utilization of library technical aides (graduates of 2-year certificate programs) in the school library until sufficient numbers of "professional" personnel are available

(4) The establishment of regional library service (perhaps within a center providing other school services), provided by professional librarians and trained supportive assistants (The librarians would visit schools on a scheduled basis to supervise and guide nonprofessionals, to provide direction in setting up libraries, and to train nonprofessional library personnel.)

(5) The establishment of additional library science degree and certification-oriented programs in Ohio colleges and universities, with a primary objective being that of making these programs available over a wider geographical area

(6) Publicizing the need for additional personnel in the school libraries, with such publicity directed at academic and library institutions, as well as the general public

(7) The establishment of a State Library Supervisor's position within the Ohio Department of Education (One of the functions of the position would be that of implementing the foregoing solutions.).

Suggestions for further work in the library manpower area are presented and briefly discussed.

PUPIL TRANSPORTATION FOR THE OHIO SCHOOL SYSTEM

In the pupil transportation task Battelle concentrated on the technical and cost factors of pupil transportation. In recent news reports, pupil transportation is most frequently encountered in relation to social problems. However, there are many other significant aspects of pupil transportation that do not meet the public eye, and have a significant bearing on the capability of the public school system to provide services. It may not be generally recognized that pupil transportation is a major enterprise and that there are complex technical problems involved in providing it. Likewise it involves large costs, and there are possibilities for decreasing the cost while providing better service. The Task Leader was Mr. Richard Byers. The Task Report is entitled "Pupil Transportation for the Ohio School System".

Pupil transportation in the State of Ohio is big business. The school bus fleet, numbering approximately 13,000 buses, transports over a million pupils at a yearly operating cost in excess of $40 million. As a supportive service, pupil transportation has little or no direct and identifiable relationship to a pupil's learning process other than to absorb funds which could otherwise be applied to some educational function. In spite of this the system is not organized as big business but is fragmented into more than 648 operating units each largely independent of the others and subject to few controls.

The general solution of the problems of pupil transportation lies in the direction of larger operating units under strengthened direction and control of the State. Restructuring of the system can make it possible to achieve economies which are not now possible. Earlier studies by the Little Hoover Commission and the Practitioner Panel concluded that reorganization is desirable for achieving significant cost savings and for improving the service. Battelle concurs with this conclusion.

Recommendations

Organization

The entire pupil transportation system should be reorganized into larger operating units. Although there are several ways in which this can be done, it is recommended that a set of transportation regions be organized within the Division of Transportation, Ohio Department of Education (ODE). The State should own and maintain all buses with the school districts continuing to share in the costs. A specific, detailed plan should be prepared for a phase-in of the new organization.

Bus Purchasing

Impediments to the centralized purchasing of school buses must be removed. Implementation of centralized purchasing is the greatest single area of potential economies.

State Purchasing of Bus Supplies

State purchasing of bus supplies should be made possible. Some supplies, gasoline for example, may be available in some areas at lower cost than a State average price. A study should be made to determine the best purchasing plan. Large-order purchasing might create problems of storage and distribution. This also should be studied.

Bus Maintenance

More uniform and better maintenance programs should be established for the school bus fleet. This can best be done by the reorganization into ODE Transportation Districts.

Maintenance Records

A uniform and detailed maintenance record system is needed to:

(1) Form a basis for a more realistic bus replacement policy

(2) Evaluate maintenance standards

(3) Evaluate bus components.

The maintenance record system being developed in Project Tri-Tran should be supported.

Bus Inspection

Bus inspections should be made at more frequent intervals by trained personnel to ensure a consistent level of safety throughout the school year. Inspections can be made by ODE Transportation District personnel if the recommended plan is implemented. Otherwise, a staff of permanent inspectors should be acquired by the Transportation Division of ODE to provide year-round inspections without adding to the load on the State Highway Patrol. The number of inspectors needed can be determined by identifying the most frequent causes of failure to pass inspections and by defining a procedure for the interim inspections.

Bus Standards

The development of bus standards should be put on a more systematic basis by:

(1) Identifying any relationships between bus condition and bus design to cause of accidents by a more thorough investigation of accidents

(2) Obtaining the use of test facilities and developing test procedures to evaluate buses and bus components (The proposed test center at Bellefontaine, Ohio, might provide a suitable location.).

Bus Drivers

The bus driver training program should be expanded. At the same time more analysis of the performance of trained versus untrained drivers should be made to evaluate the course content and its general effectiveness.

Routing and Scheduling

A computerized routing service should be made available to obtain better usage of buses. A start in this direction has been made in Project Tri-Tran and should be continued.

Transportation for Special Education

(1) Cost Reduction. Higher per-pupil costs are to be expected for transportation of special pupils, as against the costs for regular pupils, because of the dispersal of the pupils and the need for smaller vehicles. However, the large fraction of the budget which is taken for transportation suggests that a close look at the operation is warranted.

(2) Driver Training. The training which drivers should have for handling handicapped children should be defined, and a mandatory training program should be instituted.

(3) Improved Vehicle Safety. There have been suggestions that some vehicles now used for special education transportation are not as safe as they should be. Greater effort should be made to determine the requirements for transporting special education pupils, for setting construction standards, and for enforcing them.

INTEGRATION OF TASK RECOMMENDATIONS AND INSIGHTS

Battelle project management assumed responsibility for maintaining overall cognizance of the research program. In so doing, many insights were gained that could be applied to provide integration to the results of the various Tasks. As a first step, a set of critical educational needs in Ohio was formulated.

Identification of Critical Educational Needs in Ohio

Some needs are more vital than others. Battelle specified three factors to be used in assessing the relative importance of needs, and used these factors to identify a list of critical educational needs in Ohio. From an initial list of fifty needs that were identified, eighteen were classified as critical. These are the factors used to make this classification:

(1) The importance of the need, in terms of the expected consequences of not satisfying the need

(2) The severity of the need, in terms of the amount of the unsatisfied need

(3) The persistence of the need, in terms of how long it has been a need.

The eighteen critical needs that were identified are presented below by title only. The critical needs are:

(1) Specifying instructional objectives
(2) Improving the application of educational technology
(3) Improving and expanding work-oriented education
(4) Improving and expanding preschool education
(5) Improving education for the handicapped
(6) Assisting in the solution of major social problems
(7) Working with minority groups on special problems
(8) Improving counseling and guidance services
(9) Developing a sound career structure for staff
(10) Improving pre-service and in-service training
(11) Appraising staff performance
(12) Improving the management of educational data
(13) Improving the cooperation among school districts
(14) Selling the educational program to the public
(15) Improving educational leadership
(16) Evaluating the educational program
(17) Increasing efficiency in pupil transportation
(18) Providing adequate facilities for conducting education.

Setting Priorities

Even after critical needs are identified, there remains the problem of setting priorities upon the satisfaction of the needs. Battelle has not applied priority ratings to the needs, but has identified eight factors that may be used in setting priorities. These are:

(1) The estimated lead time (time for planning and implementation) required to satisfy the need

(2) The cost of satisfying the need

(3) The benefits to be derived from satisfying the need

(4) The awareness of the existence of the need by the public and educators (This has a bearing on the likelihood of successful implementation.)

(5) The estimated delay in planning that may ensue, because the satisfaction of a need may be dependent upon satisfying another one first

(6) The relevance of the need to the Title III program

(7) The relevance of the need to the responsibilities of the State Department of Education

(8) The height and number of barriers to satisfaction of the need.

In applying these eight factors to the setting of priorities, it is understood that priorities are not a measure of criticality of need, but rather reflect a consideration of what needs can be attacked first with available resources, and what resources can be employed effectively in each category.

Comments on Task Report Recommendations and Conclusions

The recommendations and conclusions given in the Task Reports have to be considered in relation to the State educational system as a whole. As mentioned before, the critical needs were formulated to provide a basis for evaluation. It was also felt proper to use the stated "Goals for 1970 of the Ohio State Board of Education" (Appendix A) as a basis for evaluation.

It was found that all of the recommendations and conclusions were related to the satisfaction of one or more of the critical needs. Clearly some of the recommendations and conclusions were of much broader scope than others, but these of narrow scope were found contributory toward the broader ones. The broad ones could always be directly related to the critical needs. Therefore, none of the conclusions or recommendations was felt to require expurgation because of failure to address the critical needs.

In considering the Goals for 1970 of the State Board, it was found that some of the critical needs were not incorporated in the Goals. Likewise, it was found that some of the recommendations and conclusions could not be connected with the Goals, even when recent modifications related to them were considered. This is understandable in view of the fact that many of the Battelle recommendations and conclusions pertain to actions extending beyond 1970. Wherever a connection could be established with the Goals, it was found that the recommendations and conclusions were in harmony with them.

The Integrative Framework

An integrative framework was established for assessing the Task recommendations and conclusions. The results given in the Task Reports could be categorized within the framework of the following categories:

- Policy and Legislation
- Management, Implementation, and Operation
- Special Education

- Resources and Planning Data
- Additional Research

In the following, each of these categories is considered separately in relation to all the Task Reports. The recommendations and conclusions treated are those which appear to require an integrative approach. All others are considered to be stated appropriately in the Task Reports.

Policy and Legislation

Policies are generally reflected in goals or in legislation. It was felt that most of the recommendations and conclusions bearing on policy or legislation could be met by appropriate legislation. One matter stood out as deserving treatment at the policy level. It relates to services.

The State provides services to the school districts in many areas of education. As a rule, these are provided at the State level, specifically through operations based in Columbus. A notable exception evolved through the need to help local districts with pupil transportation problems. The Department of Education placed area transportation coordinators throughout Ohio. As time passed, these coordinators were assigned additional functions. Now there are 37 people providing a variety of services. These include the following:

- Helping prepare proposals dealing with disadvantaged children
- Providing assistance to nonpublic schools
- Collecting and preauditing data for the School Foundation Program.

The time has come to say unequivocally that it shall be an objective of the State Department of Education to provide certain services at points more accessible to the school districts than Columbus. In addition to the services already being provided in this way, the State should provide other services. In general, these would be services which:

- Are needed by many school districts
- Involve substantial duplication of effort at the local level
- Are difficult or even impossible to provide at the local level
- Are not or cannot be provided efficiently at the State level
- Are too expensive for individual districts to provide
- Contribute to the satisfaction of critical needs in Ohio.

Examples include data processing services, computer services to provide school bus routes and schedules compatible with local needs, helping to set up and perhaps manage certain aspects of school libraries and media centers for schools that do not have libraries or qualified librarians, providing information services on sources of federal funds that are potentially available to local school districts, and providing data and assistance related to local planning of school facilities. The Battelle Task studies clearly indicate that all of these kinds of services are badly needed.

In choosing the means to provide the services, one would seek to achieve the best balance between the cost of providing them and the effectiveness of doing so. In significant instances, for example in data processing, this would indicate that the services should be provided at a regional level, though each service should be considered separately.

Regional Centers are recommended as the means for managing the service functions. Ohio can benefit from recent experience in other States that have initiated such Centers. Further details on Regional Centers will appear in subsequent sections.

It should also be a matter of policy that the State would be reimbursed for those services that are used by the local districts, on the basis of the amount of service and kind of service rendered. This provision has the prime merits that:

- It gives local districts some leverage to insure the State's performance
- It prevents local districts from making excessive and unwarranted requests for services, such as might occur if the State were paying all the costs.

At the beginning though, the State ought to be prepared to absorb some start-up costs.

Every Task Report contains at least one recommendation or conclusion that suggests the need for legislation. The principal legislation would deal with:

- Auxiliary personnel in the public schools
- Work-oriented education
- Pupil transportation
- Data processing
- School facilities
- Regional centers.

The detailed character of the recommended changes warrants careful study and cannot be treated adequately in a brief recapitulation. However some of the high points can be inferred from the ensuing discussions.

Management, Implementation, and Operation

Various approaches were given in the Task Reports to meeting the needs identified therein. In all of the Reports, problems of management, implementation, and operation were considered, and certain recommendations were made concerning these. The three aspects clearly have to be mutually consistent in order to be meaningful. Moreover, the management structure must be present to permit the management function to be exercised. Battelle has indicated that it is highly desirable that certain functions be performed regionally in Ohio, and that other functions could be done well on a regional basis. Accordingly many of Battelle's recommendations involve the creation of a management structure at regional levels. For this structure to be effective, additional leadership is required from the State. Battelle recommends that the regional activities

be conducted in regional centers under State management. In the following, the word "management" is intended to include provision of leadership at both State and regional levels. Management at the regional level could well be conducted under a Regional Board of Education elected from the ranks of local Boards within the Region.

The substance of the recommendations concerning management appearing in the Task Reports is as follows:

The State Department of Education should provide additional key staff at the State level that can render leadership in:

- Data processing
- Library and media services
- School facilities planning
- Pupil transportation
- Reports coordination
- Auxiliary personnel, definitions, and roles.

Duties and responsibilities related to such positions are described in the Task Reports.

The Task Reports also suggest that the State Department of Education should, over a period of time that would extend into 1972 or longer, acquire staff for the Regional Centers that would perform duties involving:

- Management of the Regional Center
- Vocational Education
- Data Processing
- Library and media centers
- Pupil transportation
- Auxiliary personnel
- Educational technology
- School facilities planning.

In each of the above categories services would be provided to local districts. In addition it is recommended that management and supervision for work-oriented education be provided at the regional level. The purpose of this management and supervision would be to assist in the implementation of the work-oriented concept in the Region.

It is anticipated that the changes that would be brought about through the establishment of regional centers would open up new opportunities for staff, while simultaneously eliminating the need for certain staff in the public school system.

Battelle believes that the establishment of regional centers should not be interpreted as a threat of loss of worthwhile employment in the educational system by those persons whose present positions might be imperiled by establishing regional centers.

The new positions created in the regional centers will be significant in the educational system, and should be attractive. They should be staffed to a considerable degree by persons with experience in the state education system, to minimize "start-up" problems.

In addition, there will be a need for personnel to work between the regional centers and the school districts, helping the districts to take advantage of the services and information provided by the regional centers. This need will also create new opportunities. The increased efficiency that will ensue from the regional centers should make these positions satisfying, and again these should be staffed with experienced persons, in order to minimize start-up problems.

One of the several important reasons for the recommendations that the State operate regional centers is that the State of Ohio has little homogenity. The problems of southeast Ohio are quite different from the problems of the Cleveland area, for example. While all regional centers could have common elements, the emphasis given to the various services provided could be adjusted to meet the needs of the particular region served.

As a part of its continuing research for the Ohio Department of Education, Battelle plans to consider in more detail how a regional center would be organized and operated, and how its organization might best reflect the needs of a region.

A major question for the State would appear to be: "How many regional centers should be established?" The only strong recommendation on this point that emerges from the Task Reports concerns the number of regions that appear suitable to provide data processing services. A total of 12 centers for data processing is recommended.

In the Task Report "Vocational Education and Technical Training" it was suggested that 8 or 9 might be the best, but the specific numbers mentioned appear only because Battelle had specifically studied regionalization into those numbers of regions, and the comparison was between 8 or 9 and the next largest number studied, that being 21. There is every indication that if Regional Centers were established around the 12 data processing locations, these would be suitable for managing vocational education as well. Battelle has not made a careful study aimed at optimizing the number of regional centers in Ohio, but research conducted to date has given no indication that service is critically dependent on the number selected. On this basis, Battelle recommends that the number 12 be conditionally adopted, until such time as good reasons can be found for changing the number.

The addition of regional centers should help increase the efficiency of the educational system. But this is not the only way one can get more for a dollar. As long recommended in most studies of the problems of educational management, gains can be made by creating larger school districts. These gains are typically reflected in improved education for students through a wider variety of course offerings, less teacher turnover, and better management of resources.

Battelle investigated the possibility of objective districting for vocational education. Objective districting is a procedure which permits all quantifiable information about a set of geographical units (counties, in this instance) to be employed, along with certain criteria for establishing districts, to do a districting operation whereby the units are combined into districts. It was found that it is possible to do objective districting.

Moreover, the procedure is accomodative, that is once one decides what criteria should be used, the objective districting procedure can provide a districting plan that meets the criteria. However the criteria must be realistic in terms of the available data base.

It was found possible to form vocational districts based upon numerous factors that would meet minimum, typical, and optimum requirements, provided counties were used as building blocks to form regions. Illustrations of typical results are given in the Task Report "Vocational Education and Technical Training". Data using any building block other than the county are not available. Moreover, the kind of data needed in doing objective districting is also needed in planning the curriculum on a year-to-year basis for vocational education. Accordingly, it is reasonable to suppose that for effective conduct of vocational education in a district, it would be well for a district to be the same as a county or a combination of counties. Likewise, the county is a taxing unit in Ohio, and can, therefore, be used as a base for providing revenue to operate vocational schools.

Battelle is of the opinion that, in all probability, objective districting can be applied to districting within a region, rather than to the State as a whole. If regions were established and provided with appropriate staff, it would be possible to work through regional staff to solve the districting problems within the region.

Special Education

Special Education was not the subject of a Task in Battelle's research, but it was intended that in each Task the problems of special education should be considered, wherever appropriate to the objectives of the Task. It was found that in five of the seven Tasks the recommendations and conclusions were consistent with the needs of special education and should contribute to their solution. Only in the Tasks "Educational Technology" and "Pupil Transportation" was it found desirable to discuss special education specifically. It was found that audio-visual resources for special education were in adequate supply in most of the schools sampled.

In Pupil Transportation, some evidence was found to indicate that:

- Improvements could probably be made in transportation for the handicapped
- Because the cost of transportation is a significant part of the budget for Special Education, if improvements could lead to cost savings on transportation it might be possible to divert the savings into other programs involving special education or to accommodate more children.

The pertinent recommendations are discussed in detail in the Task Report "Pupil Transportation".

Resources and Planning Data

The Task Reports present a wealth of data. These data apply primarily to the description of what resources exist that can and are being used to meet educational needs, or to planning for additional resources. For example, the school enrollment

projections on the State and county basis, extending year by year through 1975, may be useful in estimating needs for teachers, especially in the secondary schools.

Other than the data on school enrollments, it can be presumed that the data given relate directly to the title of the Task. For example, the reader will find in the Task Reports, appropriate specific data on the school library manpower needs extending through 1975, data on audio-visual aids in a substantial sample of Ohio schools, and data on auxiliary personnel now employed in the schools. In addition to these major items, it is anticipated that Battelle will provide data on library services in Ohio schools to the Ohio Department of Education in the near future.

Additional Research

Research is never-ending, and it feeds on itself. Understandably, Battelle has recommended additional research growing out of each Task area. These recommendations speak for themselves, and are presented in a manner amenable to further consideration in the Task Reports.

CONCLUSIONS

(1) The recommendations and conclusions given in the Task Reports are all relevant to meeting critical needs in Ohio schools.

(2) The recommendations and conclusions given in the Task Reports are in harmony with the Goals for 1970 of the Ohio Board of Education. However, some of the recommendations and conclusions are supplementary to these goals, since many of the former relate to activity beyond 1970.

(3) Certain services, described herein, should be provided to the school districts by the State on a regional basis. Regional centers should be established to provide these services. These should be managed by the State, acting through a Regional Board elected from the ranks of local boards within the Region. The local districts should reimburse the State for the services provided, with the reimbursement terms to be determined separately for each service.

(4) Management for work-oriented education should be provided at the regional centers. Leadership in establishing and improving work-oriented education should be a function of such management. Redistricting or districting activities should be carried out through regional centers.

(5) The State Department of Education should acquire staff to provide or increase leadership in these areas:

- Data processing
- Library and media services
- School facilities planning
- Pupil transportation
- Reports coordination.

(6) Legislation is needed to:

- Clarify the role of auxiliary personnel in Ohio schools and encourage their employment
- Provide for development of regional centers
- Provide for State ownership and management of the means of providing pupil transportation, incorporating appropriate provision for local requirements in routing and scheduling
- Alleviate difficulties in school building financing
- Provide for the management and financing of work-oriented education.

(7) Pending further research, the number of regional centers for Ohio can be taken provisionally as 12.

(8) The method of objective districting provides a method of rapid districting or regionalization (with the aid of a digital computer) that can be responsive to specific criteria. By the use of this method it is possible to create education districts or regions in Ohio that consist of one or more counties. Using this method, the entire State could be districted along county lines, or districting could be accomplished along county lines within a region.

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If we have failed to acknowledge the assistance of anyone, we apologize for the oversight. To all who helped we say "thank you".

APPENDIX A

GOALS FOR 1970 OF THE OHIO STATE BOARD OF EDUCATION

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GOALS FOR 1970 OF THE OHIO STATE BOARD OF EDUCATION*

In recognition of the fact that improvement in the quality of education is a slow but continuous process, the Board established certain goals which it seeks to achieve by 1970. These are stated as follows:

I. A professionally prepared and competent person in every educational position for which certification is required by Ohio law.

II. A program of in-service education for all school employees designed to promote growth in the ability to work with others in a variety of activities which improve the quality of instruction.

III. A program of guidance and counseling services staffed with a sufficient number of fully qualified counselors to meet the needs of all students.

IV. A program of child-study services, staffed with fully qualified school psychologists in sufficient number to meet the needs of children.

V. An immediate and continual overall appraisal and revision of the curriculum from the kindergarten through the twelfth grade and in all teacher education programs.

VI. A systematic and orderly organization of school districts, adequately financed, which will provide schools enrolling at least 500 students in grades 9 to 12, inclusive, in those communities where topography and density of population permit, so that they are capable of maintaining an efficient and complete educational program. (See footnote.)

VII. A widespread experimentation with new media of instruction and fuller utilization of those of proved merit.

VIII. A post-high school public educational system, properly coordinated and articulated with other facets of education, which will better serve the youth and adult of Ohio by providing course offerings for advanced standing in college level programs, as well as serve their need in vocational and technical education.

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*These are taken from the publication "A Brief History of the State Board of Education in Ohio", issued by the State Board in 1966. Since then, Goals VI and XII have been superseded by Board action.
On April 10, 1967, the Board adopted the following: "Each high school shall be comprehensive unless classified as college preparatory, vocational or island schools and shall schedule and operate each year in grades 9 through 12, in separately organized classes with students enrolled, at least 45 units of credit." This supersedes Goal VI.
On January 9, 1967, the Board adopted the following: "Area Education Districts. Area Education Districts should be formed to provide specialized programs and services in an area . . . In rural areas the 35,000 pupil base can be achieved with the inclusion of two or more counties . . . In urban areas, the AED centers should exceed 75,000 for quality, efficiency, and economy." Battelle interprets this action as superseding Goal XII.

IX. The development, expansion, and improvement of the program of vocational rehabilitation, so that every Ohioan handicapped by disability may have prompt skilled help in achieving rehabilitation.

X. A program of parent and community education, aimed at the development of attitudes toward education which will result in improved motivation of students to take full advantage of improved educational opportunities.

XI. A closer working relationship with other departments of government and community agencies having responsibilities that affect children.

XII. Not later than July 1, 1970, all school districts in Ohio containing fewer than 10,000 pupils in A.D.M. shall become units within a Regional Administrative Service Unit of 10,000 pupils or more in A.D.M. (See footnote.)

AUXILIARY PERSONNEL
DATA PROCESSING
EDUCATIONAL TECHNOLOGY
SCHOOL FACILITIES
LIBRARY MANPOWER
PUPIL TRANSPORTATION
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